

Brief update on.....

**GEO Inland and Nearshore Coastal  
Water Quality Remote Sensing Workshop  
Work task WA-06-01**

27 - 29 March 2007, Geneva, Switzerland  
co-chaired by IGOS-P IGWCO (Steven Greb) & GEO (Antti Herlevi)

User Interface Committee meeting  
Washington D.C., 1-3 Aug. 2007

## Organizing committee

Steven Greb	IGOS-P, Finland
Antti Herlevi	GEO, Finland
Anatoly Gitelson	U Nebraska
Arnold Dekker	CSIRO
Tiit Kutser	Estonian Marine Institute
Marv Bauer	U Minn.
Paul Digiacomo	NOAA

# **Implications of Poor Water Quality**

## **Impacts> Human**

**One billion of population inadequate drinking water**

**2.6 billion of population inadequate sanitation**

**Two billion water borne illnesses annually**

## **Impacts> Ecosystem**

**Half major rivers and lakes degraded**

**Accelerated algal blooms, D.O. depletion**

**Toxicity**



# Recent Global Attention

1992 Earth Summit

1996 World Water Council- WWF

2002 World Summit on Sustainable Development  
Resolutions#27,28

27. Support developing countries and countries with economies in transition in their efforts to monitor and assess the quantity and quality of water resources, including through the establishment and/or further development of national monitoring networks and water resources databases and the development of relevant national indicators.

28. Improve water resource management and scientific understanding of the water cycle through cooperation in joint observation and research, and for this purpose encourage and promote knowledge-sharing and provide capacity-building and the transfer of technology, as mutually agreed, including remote-sensing and satellite technologies, particularly to developing countries and countries with economies in transition.

2003 Third Water Forum, Kyoto “Year of the Freshwater”

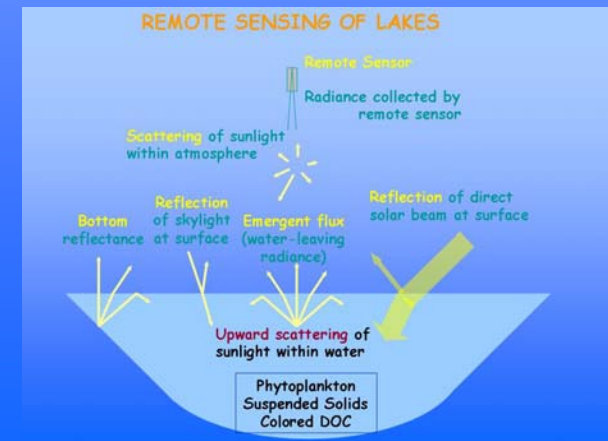
The collection, analysis, dissemination, and utilization of water data and information around the world requires greater investment, especially in information-poor areas in the developing world where poverty, water scarcity, floods, droughts, pollution and disease have devastating impacts.

2005 UN International Decade for Action 'Water for Life' 2005-2015.

# Use of Remote Sensing in Water Quality Measurements

## *Potential advantages over conventional monitoring*

- Large spatial coverage (e.g. Landsat 185 km x 185 km)
- Simultaneous sampling
- Provides alternative to in-situ monitoring when financial, institutional, technical resources are lacking
- Continuity of historical records/ political instability
- Quick dissemination/sharing of data/transboundary issues



# **GEO Inland and Nearshore Coastal Water Quality Remote Sensing Workshop**

27 - 29 March 2007, Geneva, Switzerland

## **Goal**

To bring together remote sensing data providers and expert users to improve our ability and capacity to remotely assess and monitor inland and nearshore coastal water quality.

## **Objectives**

To assess existing and planned remote sensing capabilities; identify gaps relative to user needs in the acquisition, processing, distribution and utilization of remote sensing data and derived products for water quality research and applications; and formulate potential solutions to address these gaps and other related challenges.

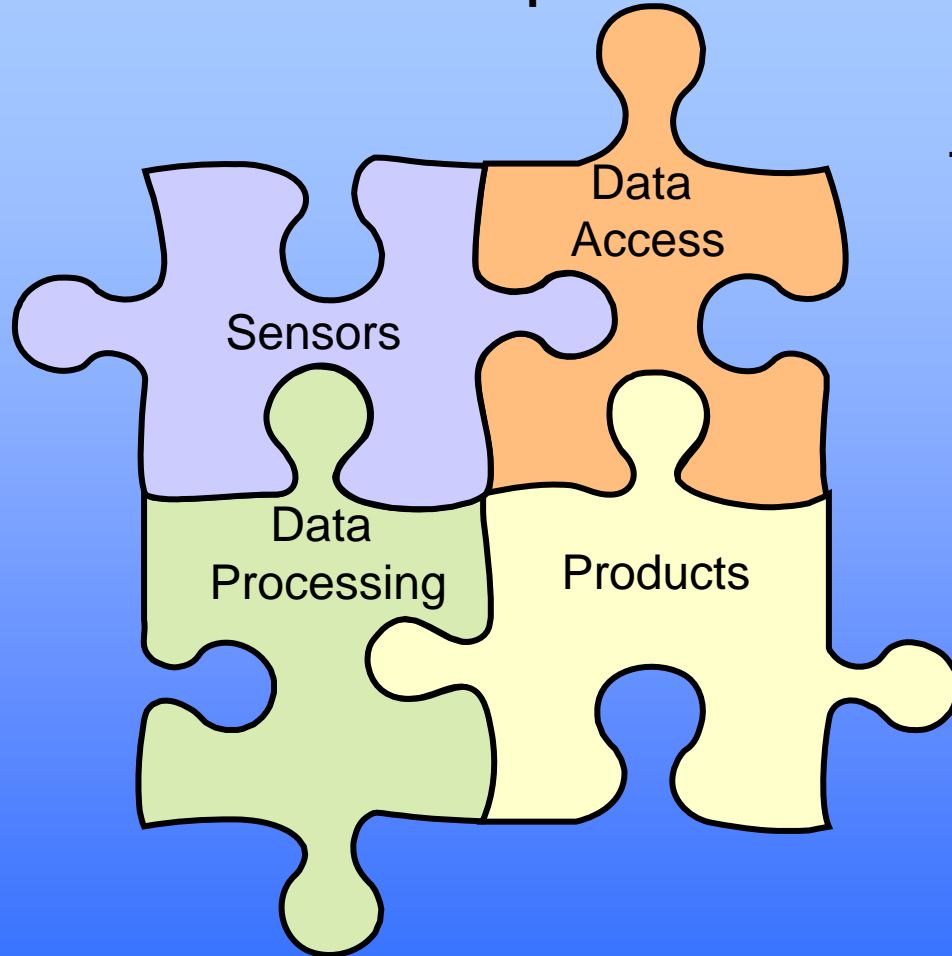
## **Products**

Recommendations to data providers and GEO Members and Participating Organizations on short-term priorities for improving remote sensing capacity and utilization for water quality assessment and monitoring, as well as formulating short and long term strategies to identify, enable and implement enhanced capabilities.

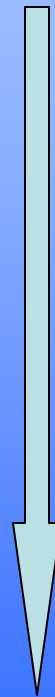


# Breakout sessions

Focused on four important issues.....



.....addressed in five sequential sessions



**I: Identify Gaps**

**II: Inventory of Causes for Gaps**

**III: Proposals for Solutions to Gaps**

**IV: Priority setting for proposed solutions**

**V: Synthesis, Discussion, Recommendations**





55 participants  
26 countries  
Diverse group-geographically and in expertise  
Extremely dedicated group of people!





## **Writing Teams**

### **1. Remote Sensors**

Paul DiGiacomo/Simon Hook/Andreas Neumann

### **2. Data Acquisition and Distribution**

Steve Groom/Nicolas Hoepffner

### **3. Data Processing and Product Development**

Mark Dowell/Burt Jones/Soo Chin Liew

### **4. What can be delivered vs. What should be delivered?**

Arnold Dekker/Herman Gons/Maycira Costa

### **5. Calibration/Validation**

Menghua Wang/Jean-Francois Berthon/Ru Morrison

### **6. Special Needs and Requirements of Developing Countries**

Chris Mannaerts/Maycira Costa/Val Byfield/Wahid Moufaddal/Bilqis Amin Hoque

Editing Team - Organizing Committee, John Lyon, Maycira Costa

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Editing Team - Organizing Committee, John Lyon

An example of chapter structure and information.....

## 6. Special Needs and Requirements of Developing Countries

Chris Mannaerts/Maycira Costa/Val Byfield/Wahid Moufaddal/Bilqis Amin Hoque

### Background

Lesser developed countries are key shareholders of large tracks of coastline, large estuarine areas as well as vital freshwater ecosystems. There is a special need to address specific issues and needs particular to developing nations in order to better articulate their role and participation in this field and in the GEO process in general

### Issues and gaps

The following *generic* issues were raised and gaps identified:

- >Most developing countries are characterized by a lack of a sustained long-term local infrastructure in both, human capacity and physical operational satellite and *in situ* observing systems;
- >A strong fragmentation of mandates among institutions and administrations dealing with multiple aspects of WQ, leading to poorly coordinated actions and efforts.
- >Poor recognition and awareness of the societal importance, cross-cutting impact of water quality issues in country social and economic development, leading to lower priority in fund allocations. As a consequence, long term observation or *in situ* monitoring programs are usually defunct of operational budget and staff.

## 6. Special Needs and Requirements of Developing Countries

Chris Mannaerts/Maycira Costa/Val Byfield/Wahid Moufaddal/Bilqis Amin Hoque

### **Issues and gaps.....continued**

In relation to the use of *in situ* and satellite monitoring for WQ, the following issues and gaps were identified:

- >Lack of data sharing interests and standardized exchange mechanisms (data protocols, database standards, data quality controls) between institutions, departments and countries (e.g. sharing freshwater resources).
- >Compared to temperate regions, there is far less knowledge on adequacy of retrieval algorithms in tropical waters (e.g. coastal case II waters).
- >The cost of certain optical satellite or airborne data needed for monitoring water quality parameters is prohibitive for many lesser developed countries.

## 6. Special Needs and Requirements of Developing Countries

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### **Solutions and priorities**

- >Ease the free accessibility to satellite data usable for monitoring freshwater and coastal water quality in developing countries;
- >Use local scientific communities to identify the feasibility and applicability of remote sensing combined with in situ monitoring for solving their water quality issues;
- >Facilitate coordination and collaboration between member countries in the field of water quality monitoring strategies, set-up of in-country and coastal monitoring networks;
- >Support national and regional capacity building initiatives, comprising education and training and local permanent infrastructure building, to collect, analyze, use and disseminate data

## 6. Special Needs and Requirements of Developing Countries

Chris Mannaerts/Maycira Costa/Val Byfield/Wahid Moufaddal/Bilqis Amin Hoque

### **Recommendations**

Recommendations which could be realized in the short term as fast-track initiatives identified are:

- >Inventory of the demand for EO products in relation to water quality in developing countries, and establish the points of contacts in the GEO member countries in relation to the WQ theme (e.g. start from UNEP GEMS focal points).
- >Include the freshwater and coastal water quality issue in the GEO presentation for the ministerial level GEO meeting (Nov, 2007).
- >Launch capacity building initiatives in some developing countries with active involvement of graduate students and researchers from western universities.
- >Support the development of e-learning and distance learning in remote sensing for water quality, using freeware and open source domain software tools (e.g. BILKO, SPRING, ILWIS, SeaDAS, BEAM/Visat, etc.);

## 6. Special Needs and Requirements of Developing Countries

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### **Recommendations**

- >Use and organize int'l field measurement campaigns (also as capacity building segment) in developing countries and/or foster active participation of developing countries in int'l calibration - validation campaigns.
- >Initiate awareness building and extension in EO for water quality at secondary school level (e.g., the GLOBE project for teaching teachers and children *in situ* environmental monitoring).
- >Support ICT initiatives to promote EO-derived water quality maps in e.g. Google Earth or similar web-based global services.
- >Facilitate and conduct pilot projects in countries faced with emergency water quality problems.



## 6. Special Needs and Requirements of Developing Countries

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**Recommendations** (fitting the long-term strategies of GEO, in line with GEO 10-yr IP were):

- >Use GEO as an umbrella organization for creating a global partnership between developing nations and the int'l global observing science community in the field of water quality Earth Observation;
- >GEO to promote fund raising (e.g. donor conference) for establishing long term programs in regular monitoring of water quality in data scarce or poorly studied areas in developing countries.
- >Support developing countries for instrumentation needed for *in situ* Cal/Val operations and EO data acquisition.

## Approx. Timetable for report completion

27 Jul. – 01 Sep. Technical and editorial review

15 Sep. Committee meeting (Conference call)

15 Oct. Submit to GEO for review?

Nov.1 Distribution? Posted on IGWCO and  
GEO websites